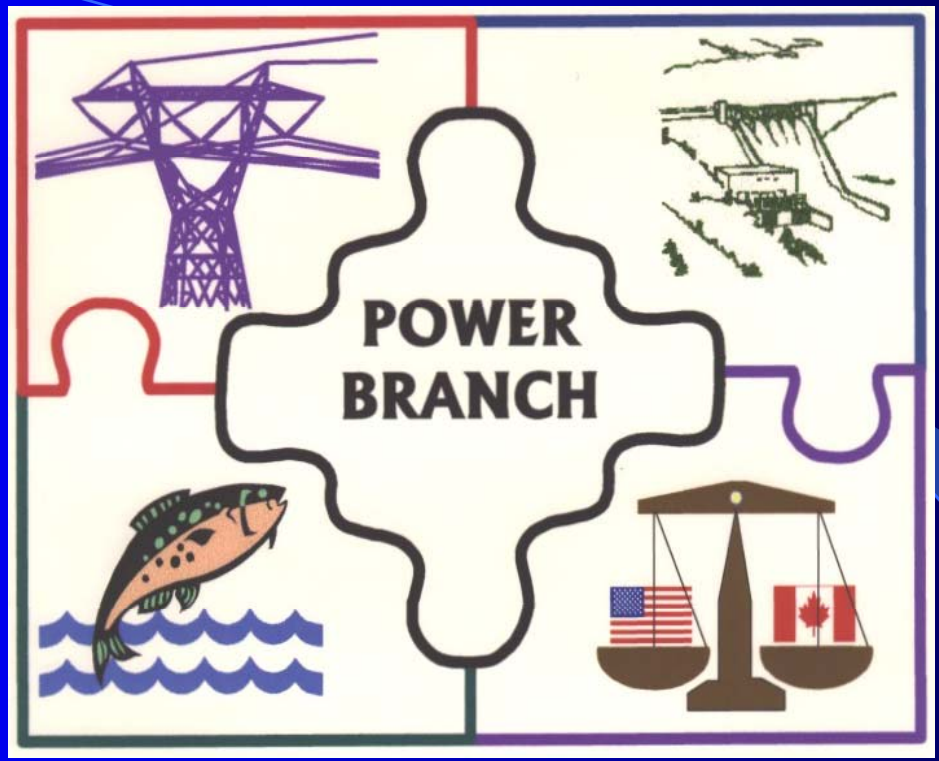

WATER MANAGEMENT DIVISION
POWER BRANCH
Hydro Planning; Rehab Justification; JOC
RESERVOIR CONTROL CENTER
Real-time, Fisheries, Water Quality
HYDROLOGIC ENGINEERING BRANCH
Flood Control, Database



Annual Operational Planning

Hydropower Coordination

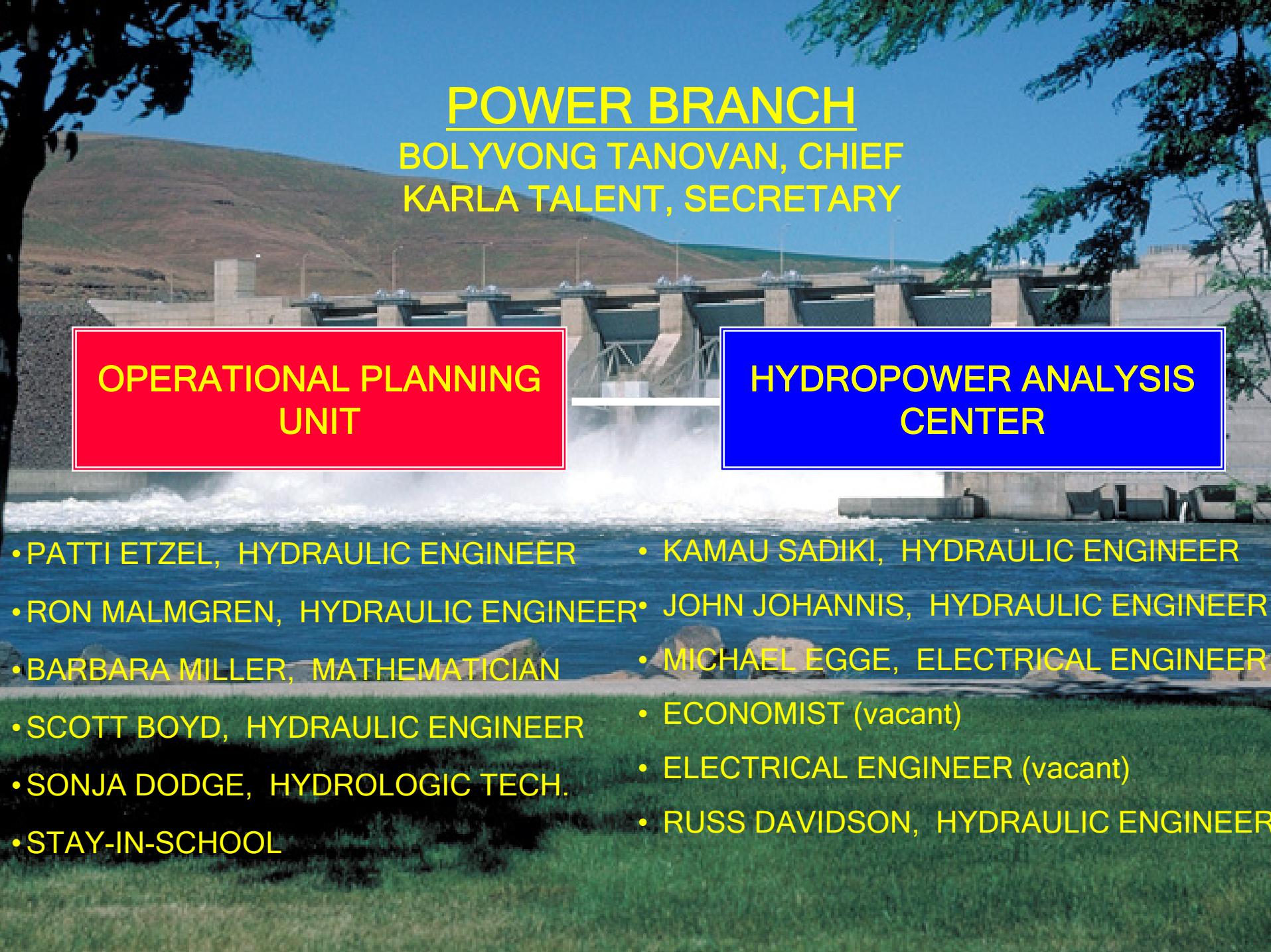
Power Impacts Studies

Hydropower Analysis & Economic Evaluation

COE-BPA JOC

FERC, PEBCOM, Coastal Engineering

http://www.nwd-wc.usace.army.mil/PB/mainpage.html



POWER BRANCH

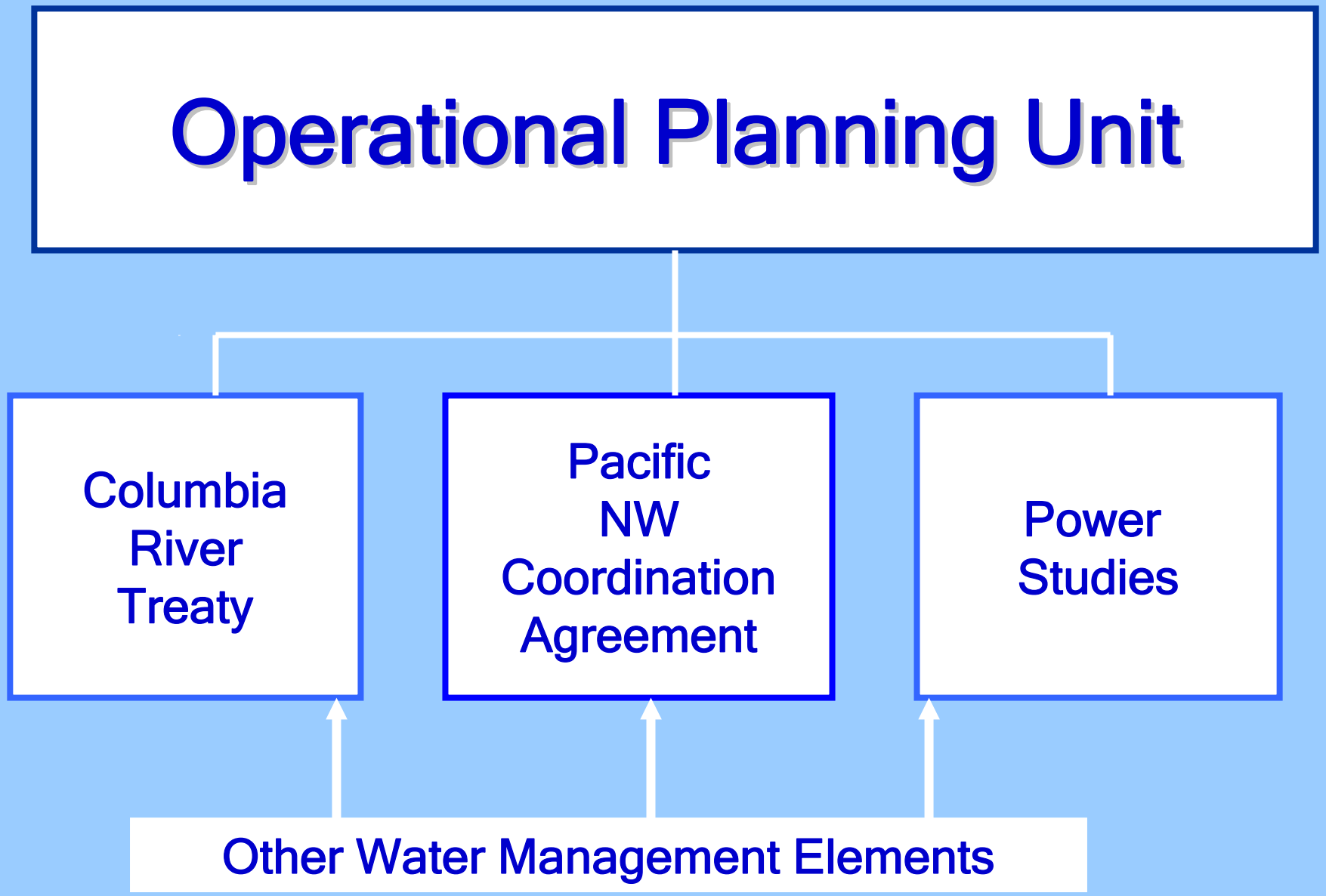
BOLYVONG TANOVAN, CHIEF
KARLA TALENT, SECRETARY

OPERATIONAL PLANNING UNIT

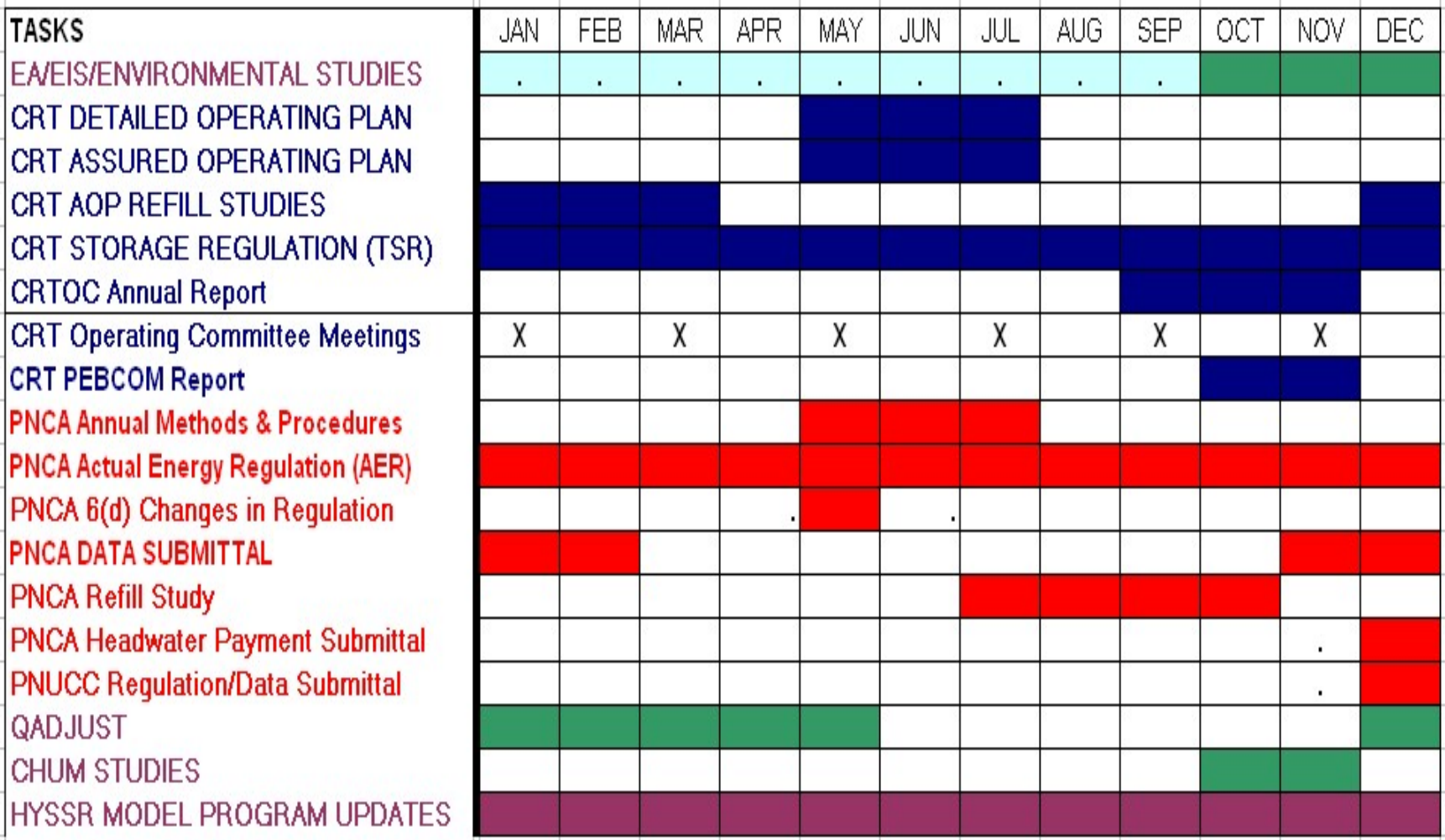
- PATTI ETZEL, HYDRAULIC ENGINEER
- RON MALMGREN, HYDRAULIC ENGINEER
- BARBARA MILLER, MATHEMATICIAN
- SCOTT BOYD, HYDRAULIC ENGINEER
- SONJA DODGE, HYDROLOGIC TECH.
- STAY-IN-SCHOOL

HYDROPOWER ANALYSIS CENTER

- KAMAU SADIKI, HYDRAULIC ENGINEER
- JOHN JOHANNIS, HYDRAULIC ENGINEER
- MICHAEL EGGE, ELECTRICAL ENGINEER
- ECONOMIST (vacant)
- ELECTRICAL ENGINEER (vacant)
- RUSS DAVIDSON, HYDRAULIC ENGINEER


Operational Planning Unit
Columbia River Treaty
Pacific NW Coordination Agreement
Power Studies
Other Water Management Elements

HYDROPOWER PLANNING SCHEDULE



COLUMBIA RIVER TREATY

INTERPRET/IMPLEMENT

- Principles & Procedures
- Entity Agreements

COORDINATE ANNUAL PLANNING

- Assured Operating Plan
- Determination of Downstream Power Benefits
- Detailed Operating Plan
- Support for Canadian FC Studies

PACIFIC NW COORDINATION AGREEMENT

Coordination / Implementation / Rights & Obligations (ensure return of Canadian Entitlements)

Planning (Data submittal / Actual Energy Regulations / Refill Studies)

Operation

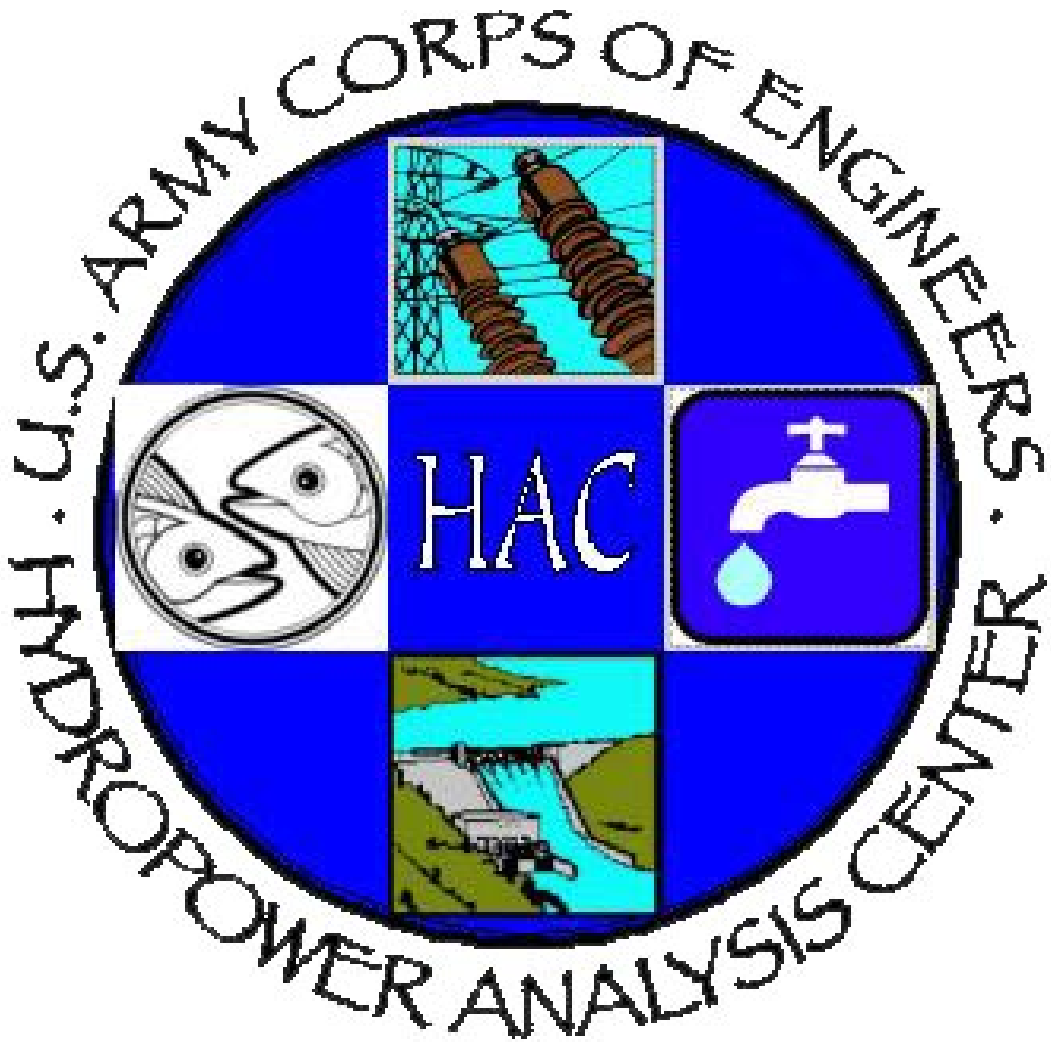
HYDROPOWER STUDIES

- Reconnaissance & Feasibility, PAC
- Drawdown: Lower Snake River Feasibility; JDA Recon.; Libby Variable Q
- NEPA and ESA: Willamette Steelhead, White Sturgeon, Bull Trout, Salmon BiOp '95, '98
- BON Min. Gap Runner, TDA Major Rehab, Cougar/Blue R
- Regional Power Planning & Fed. Execs Support

OPERATIONAL PLANNING UNIT

- **PATTI ETZEL**: Team Leader; Technical Oversight; Regional Coordination, AOP/DOP, PNCA Refill, Special Studies, QA, ITR
- **BARBARA MILLER**: AOP/DOP, PNCA Refill, Special Studies, SAAC
- **RON MALMGREN**: HYSSR Support, Special Studies, Short-term Ops, Columbia Vista
- **SEAN ROSE/SCOTT BOYD**: AER/TSR, Special Studies, Data Submittal, PNUCC, PC Hardware Support
- **SONJA DODGE**: TSR VECC, AER Proj. Ops & FC; QADJUST; Database

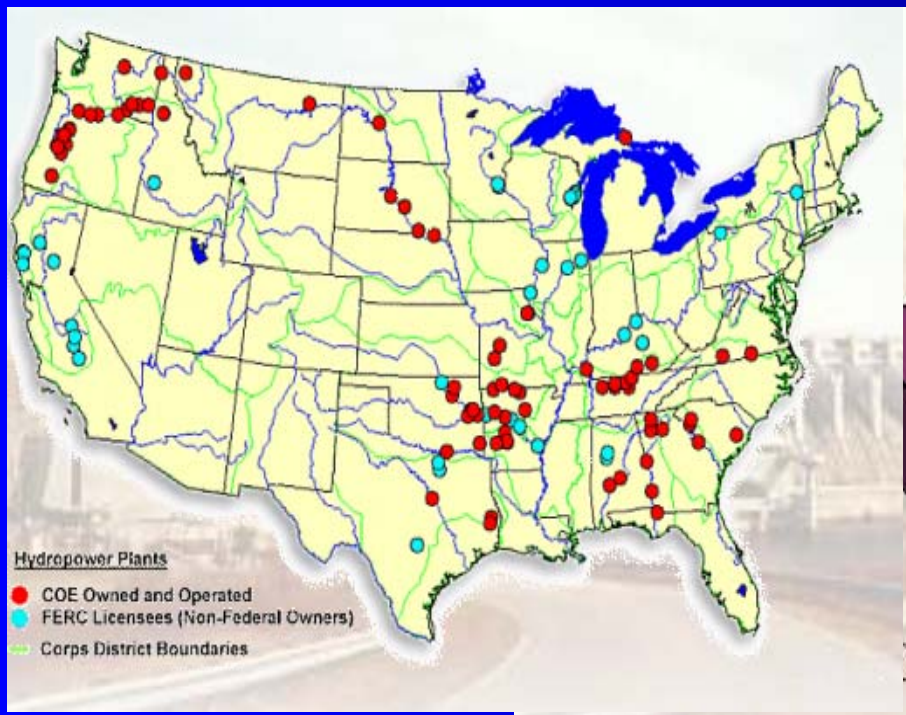
HYDROPOWER ANALYSIS CENTER

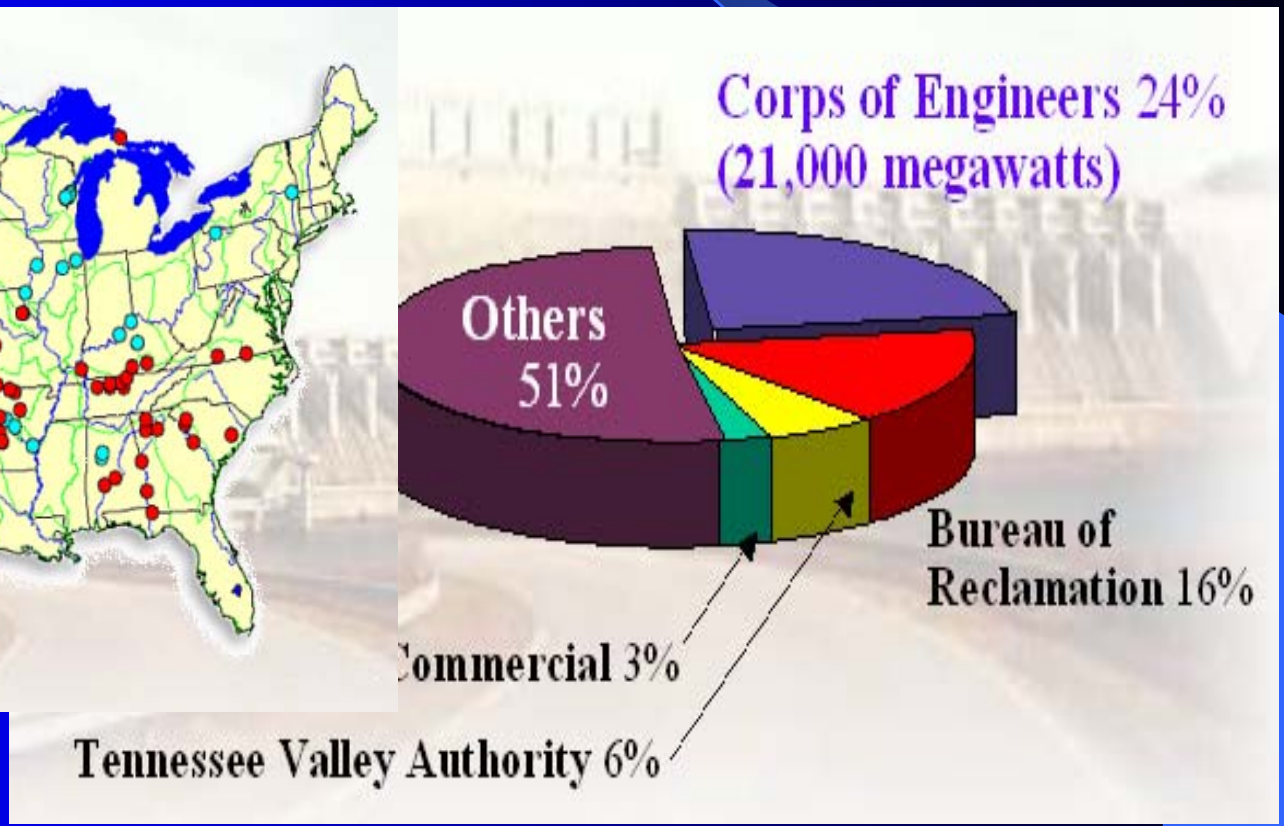


The Corps and Hydropower

Corps Hydro: 24% of US hydro; 3% of US Electrical Power.

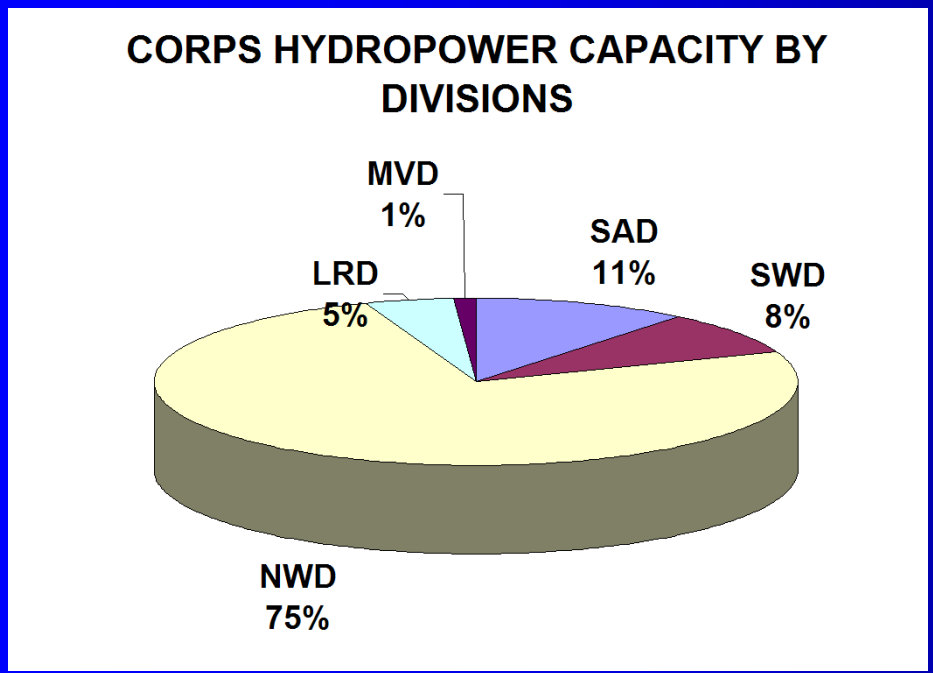
$18 billion investment (75 plants; 375 generating units)





US Army Corps
of Engineers.

NWD-NP Hydropower



Largest NWD-NP Hydropower Dams
(by MW Install. Cap.)

Chief Joseph (NWS)	2,460
John Day (NWP)	2,160
The Dalles (NWP)	1,800
Bonneville (NWP)	1,093
McNary (NWW)	980
LWG, LGS, LMN (NWW)	810 (each)
IHR (NWW)	603
Libby (NWS)	525
Dworshak (NWW)	400
Total Willamette (NWP)	320

Bonneville Dam Second Powerhouse

US Army Corps of Engineers.

HAC Roles & Capabilities

The HAC has over 40 years of experience in :

- Powerplant sizing, upgrades, and rehabilitation
- River system analysis
- Cost allocation and reallocation
- Power value and benefit computations
- Environmental and other powerplant studies

- Staff is cross-trained & familiar with stakeholders in all regions
- Works closely with 16 districts, PMA's, HQUSACE
- Helps the COE meet its hydropower functions efficiently
- Maintains in-house hydropower expertise to ensure that Corps can continue to efficiently carry out its hydropower mission
- Support US assistance to Third World countries (e.g., Chin Korea, Nigeria, Mozambique, etc.).

US Army Corps of Engineers.

U.S. ARMY CORPS OF ENGINEERS · HAC · HYDROPOWER ANALYSIS CENTER

Organization and Relationships

STRUCTURE:

- Civil Works Mgmt. Directorate
- Water Mgt. Division
- Power Branch
- Hydropower Analysis Center

GUIDANCE:

- N'l Hydro Team Leader
- HAC Advisory Board

PARTNERS:

Hydroelectric Design Center

CUSTOMERS:

- JOC (Capital WGr.)
- Other Districts
- Other PMA's
- Other Agencies

US Army Corps of Engineers.

U.S. ARMY CORPS OF ENGINEERS · HYDROPOWER ANALYSIS CENTER · HAC

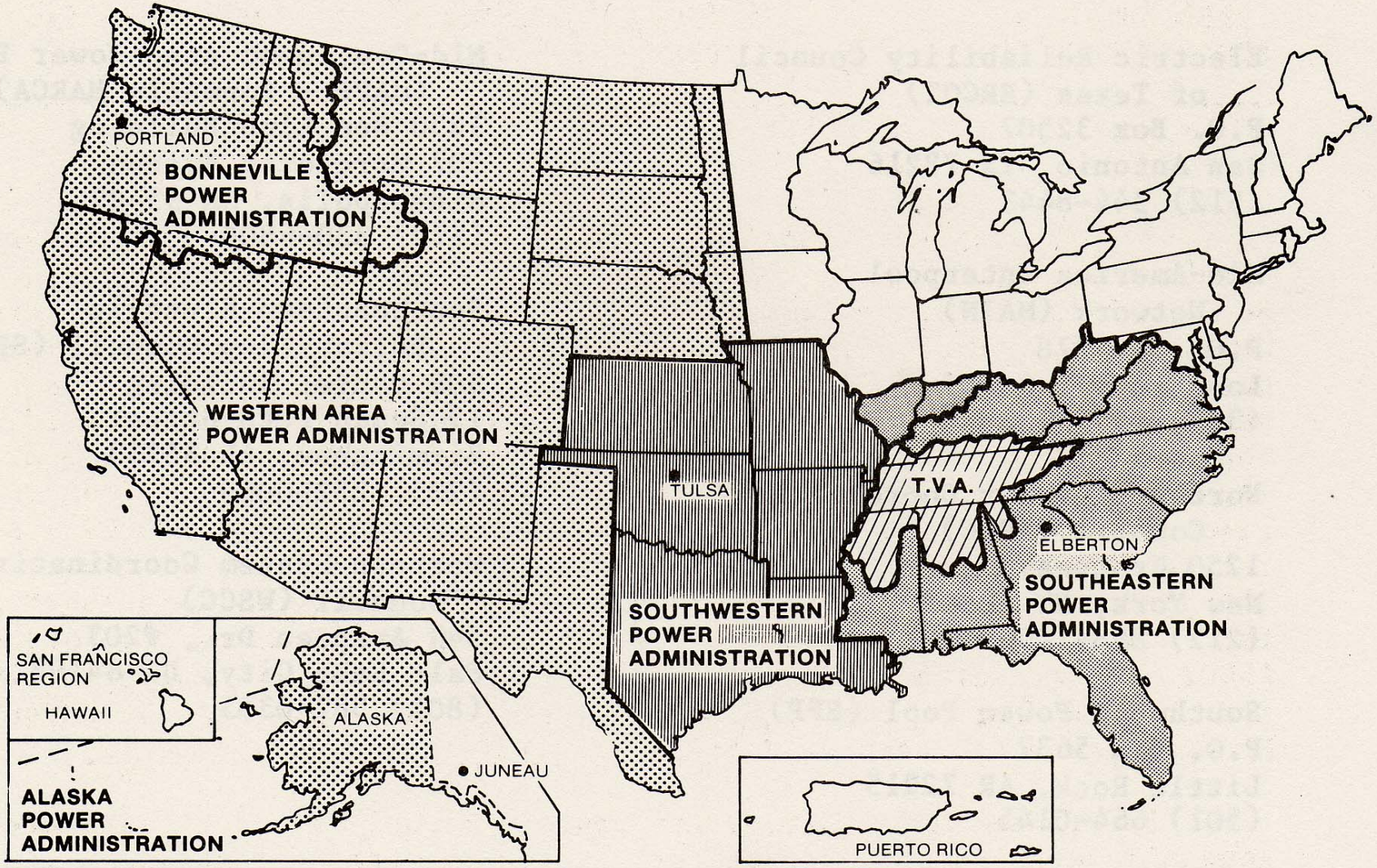
Problems & Opportunities

- Average age of powerplants: 35 years
- 349 turbines are due for replacement/rehab due to
  - ✓ Normal wear and tear
  - ✓ New operating criteria for turbines operation
- Need to develop rehabilitation/upgrade plan for ALL Corps generation facilities
  - ✓Investments to be systematically analyzed and prioritized on a system basis –rather than piece-meal.
  - ✓Recognize regional differences
  - ✓Adapt to new funding climate
  - ✓Use uniform and consistent evaluation criteri

US Army Corps of Engineers.

U.S. ARMY CORPS OF ENGINEERS · HYDROPOWER ANALYSIS CENTER · HAC

Federal PMA Boundaries



TWO HYDROPOWER CENTERS OF EXPERTISE:

- Hydropower Analysis Center (HAC):

hydropower and water resource planning and analysis

(originally established in 1949)

&

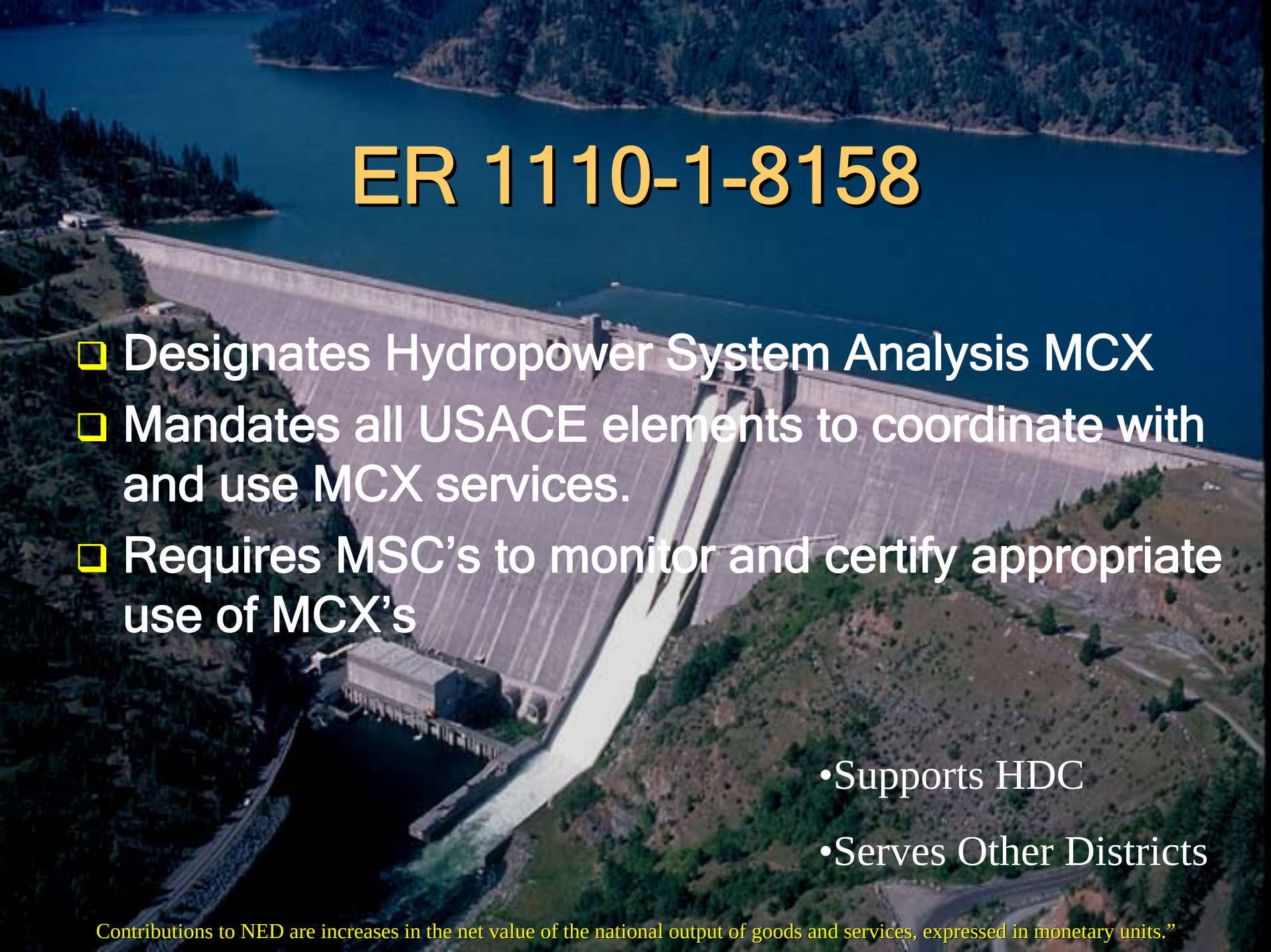
- Hydroelectric Design Center (HDC):

engineering and design

(originally established in 1948)

BRIEF HISTORY

- Formed in 1949 as Hydropower Evaluation Section
- Purpose: Hydropower Economic Analysis to Determine Feasibility of Proposed Hydropower Developments in Pacific Northwest
- Later role expanded to cover all US Corps projects and Foreign Countries (e.g., China, South Korea, Nigeria and Others)
- Gained National Hydropower MCX Status in 1996



ER 1110-1-8158

- Designates Hydropower System Analysis MCX
- Mandates all USACE elements to coordinate with and use MCX services.
- Requires MSC's to monitor and certify appropriate use of MCX's

•Supports HDC

•Serves Other Districts

Contributions to NED are increases in the net value of the national output of goods and services, expressed in monetary units."

MAIN EXPERTISE AREAS

1. Hydropower Planning
2. Energy Studies
3. Capacity Studies
4. Economic Analysis
5. Power Impact Studies
6. Turbine Performance Selection
7. FERC Licensing
8. Regional Planning Issues
9. Hydropower Manual
10. Treaty PEBCOM
11. Procedures Development

MAJOR PLANT REHABILITATION

- Alternatives Plan formulation
- Energy and Capacity
  - ✓ Production
  - ✓ Values
  - ✓ Benefits
- Risk Analysis
- Technical Review

MAJOR RIVER SYSTEM POWER & ECONOMIC ANALYSIS

due to changes in project operation, equipment, water diversions, and others

- Calculate Changes in Energy and Capacity
- Estimate Energy and Capacity Values
- Estimate Power Benefits
- Assess Other Related Impacts

COST ALLOCATION & WATER SUPPLY REALLOCATION

- Analysis of hydropower benefits for multi-purpose water resource projects.
- Identify power benefits and revenue foregone with storage reallocation for municipal and industrial uses (White River Minimum Flow Study, SWL and Lake Greeson, MVK)

MISCELLANEOUS POWER PLANT STUDIES

- Environmental/Fishery: Power Impacts from project features changes (The Dalles Sluiceway, NWP; Variable Q Flood Control, NWS).
- Generator Rewind and Uprate (Narrows Generator Rewind, SWT; Garrison Uprate, MRR)
- Plant Expansion (Expand/Add generation capabilities @ Libby, NWS).

SPECIAL PROCEDURE TO SUPPORT COE-BPA INVESTMENT DECISION

- Traditional COE Approach
- Developing the CIDAG
- Key details of CIDAG
- Applications

HYDROPOWER ANALYSIS CENTER

KAMAU SADIKI: Tech. Mgr; Tech. Oversight; Project Mgmt; Regional/National Interface; Marketing; JOC, PEB; Special Studies

Sr. ENGINEERS (MIKE EGGE/JOHN JOHANNIS): Tech. Lead, Major Rehab, Water Supply, Special Studies, ITR, FERC Licensing

Sr. ECONOMIST (VACANT): In-house Economic Expert; Economic Benefit Assessment; Special Studies; Risk Modeling; NED; ITR

HYDRAULIC ENGINEERS (RUSS DAVIDSON + VACANT): Special Studies; Modeling; Report Preparation; Project Coordination; ITR

LONG-TERM CHALLENGES

- Less O&M study dollars
- Low hydropower priority & no new starts
- Less rigorous economic analyses required
- Uncertainty in future funding outlook
- Unclear policy re. Analysis Level
- Experimenting with Untested PMA Funding
- Uncertainty about role under 2012 Plan
  - ✓Consolidating with HDC ?
  - ✓Staying with WM (per 2001 PAT Team) ?

Thank You!

Iguazu, Brazil